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AUTHOR Sipple, John W.; Avery, Leanne; Beasely, Heather; Faessler, Lauren; Meyer, Dan

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ABSTRACT

A study of the impact of student-teacher ratio on student learning in New York State examines results on statewide assessment instruments across the rural-urban continuum. Data were analyzed for 614 of New York's 760 school districts and included various indicators of district wealth; urban, suburban, town, or rural location; local poverty; rate of 4th-grade students meeting or exceeding state assessment standards; rates of high school students passing the State Regents exams, scoring very well on the exams, and receiving a Regents diploma; and three educator-to-student ratios. As in many other studies, the most important predictors of student achievement were related to school district wealth. Even wealthy districts with low tax rates and low school spending had strong positive effects on student achievement. However, rural districts performed quite well when district wealth was held constant, and town-based districts scored as well on the English Regents exams as did suburban districts despite having far less wealth. Rural districts had slightly better teacher-student ratios than did other locations, but this advantage was not associated with better student performance. Only modest effects were found for educator-student ratios and mostly in the negative direction. An appendix presents data tables and figures. (SV)

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A Study Analyzing the Relationships Among School District Staffing of Teachers, District Wealth, and Higher Learning Standards in New York State.

A Report prepared for the *2000 Rural Schools Conference*

Cooperstown, NY

July 9, 2000

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Prepared by
John W. Sipple
Leanne Avery
Heather Beasely
Lauren Faessler
Dan Meyer
Cornell University

Any comments, questions, or concerns should be addressed to:
John W. Sipple
Assistant Professor
421 Kennedy Hall
Cornell University Ithaca, NY 14853
(607) 255-3005
jws28@cornell.edu

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Background

At the November, 1999 meeting of the New York State Rural Schools Program (RSP) Board of Directors, the Research Subcommittee posed a question that centered around the relationship between the ratio of teachers to students and the performance of school districts on the new state standards. The question is based on two premises. The first is that one the most significant factors in a quality education is teacher-student contact time. The second premise is that the staffing of teachers is the single largest component of any school district budget. The subcommittee suggested that the more educators (teachers, other professionals, and paraprofessionals) that are present in a school, the greater the opportunity for additional student learning. In addition, the group was well aware of the cost implications of hiring additional staff and the disparity of state funding across the urban to rural continuum. Moreover, given the uncertain relationship between additional school resources and student performance in the research and policy literature, the effect of the number of educators per student is another way to assess what money buys. This paper summarizes the preliminary findings of this investigation.[1]

Research Question

In short, the committee posed the following research question: What impact, if any, does the number of teachers in a school district have on student learning? More specifically, what is the relationship of the ratio of educators to student performance on the highly

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[1] For a more complete treatment of the study and the findings, please contact the authors at Cornell University.

publicized assessment instruments in New York State. The outcome variables we used in this study are the 1999 4th grade ELA and Math assessments and the 1999 English and Mathematics Course 1 Regents Exams.

Data and Methods

Data

The data for this study come from several sources. The major data source is the publicly available *2000 School Report Card* data file from the NY State Education Department (NYSED.[2] These data include the student performance data on multiple measures over several years (1997-1999), school demographic and organizational data, and other school and district performance measures. We then merged the School Report Card data with school district financial data also obtained from the State Education Department via the Rural Schools Program. These data include the combined wealth ratio (CWR; a measure of community wealth based on income and property values), the approved operating expenses (AOE; the dollars per pupil spent on basic district operation excluding items such as capital improvements), and the "small cities" (Hurd) tax rate (Tax Rate; the property tax rate earmarked for district operation). We also obtained access to the New York State Standards Implementation Study, in which the State Education Department is sampling 309 assistant superintendents from around the state to assess how the participating districts are making progress toward the new Regents Learning Standards. At this time, we only have access to the district-level data (Assistant Superintendent

[2] Available at http://www.nysed.gov

Survey) from year one, though the building-level and year-two data are scheduled to be released shortly. In this report, we do not report on our findings from the Standards Implementation data because we have yet to submit our analyses for "approval" (due to confidentiality issues) to the NYSED. Finally, data from the federal government (both the U.S. Education Department and the U.S. Census Bureau) provided measures of urbanicity (e.g., urban, suburban, rural) and local poverty measures (the indicator used to distribute Title 1 funds to school districts). Initially consisting of the universe of school districts on New York State (n=760), we removed districts with significant amounts of missing data and a small number of atypical districts that caused practical and statistical difficulties. The final sample size for most of our analyses is 614 school districts.

The unit of analysis for this current study is the school district. While there is debate as to how best measure the relationship between available resources and student performance (e.g., individual, classroom, school, district), we as yet do not have reliable and detailed sub-district-level funding data. As a result, this study maintains the unit of analysis at the district level. When better school and classroom level data (fiscal and personnel) become available, we will conduct such an analysis.

Methods

The current study consists of two parts. First, we provide simple descriptive statistics (means and standard deviations) on several key variables categorized by several measures of school district location and type. On these bi-variate descriptive statistics, we conducted significance tests (ANOVAs with post-hoc tests) to determine whether the district level means are statistically different across the various categories. We present the

results in both tabular (see Table 1 & 2) and graphical (see Figures 1-4) representations. Second, we present a regression model in which we formally analyzed the main research question which allowed us to control for other relevant variables. We used the same model for the six outcome variables (see Table 3 & 4 for regression results).

Outcome Variables

The outcome variables for these analyses are student performance data from the New York State student assessment program. We first use the new 4th grade ELA and math results (aggregated to the district level) as a measure of early school performance. Students scores are reported on a four-level scale consisting of level 1 (serious deficiencies), level 2 (deficient), level 3 (meeting standards), and level 4 (exceeding standards). For the purposes of this analysis, we then used level 3 as a cutoff and measured the effect of the predictor variables on the percent of the 4th grade test takers who earned a score of level 3 or level 4.

The second set of outcome variables includes the passing rates (at 65%) for the Math Course 1 Regents exam and the English exam. To be consistent with other studies of NY State Regents performance and because the current 55% passing rate is temporary, we defined passing as scoring 65% or better. When calculating passing rates, however, two methods can be used. First, a passing rate can be calculated by dividing the number of students in a district who passed the exam and divide it by the number of students who actually took the exam. We call this the "pass rate of takers." The second way in which a passing rate can be calculated is to divide the number of students passing the exam by the average grade equivalent (AGE). Simply put, the AGE is the number of students in the

high school (typically grades, 9-12) divided by the number of grades (typically 4). We term this the "pass rate of AGE." For the majority of our analyses we opt for the AGE calculation of passing rates.

We were also interested in the rate at which students scored very well on the exams. To do this, we calculated the rate at which students in a district scored at 85% or better. We calculated this both for the rate of takers and the rate of AGE though only report the AGE statistics.

Finally, another measure of total district performance is the percent of students graduating with a Regents diploma. This is important because it is now the official position of the Board of Regents to have all students in New York State earn a Regents diploma. We used two outcome measures related to this indicator. First, we used the percent of 1999 graduates who earned a Regents' diploma. Second, we examined the rate at which districts improved the percent of their students who earned a Regents diploma. To do this, we calculated the difference between the percent Regents diplomas in 1997 and 1999.

Independent Variables

We used several independent, or predictor, variables in these analyses. We broke these into three categories: Demographic, Ratios, and Fiscal. The demographic variables consisted of the percent of children aged 5-17 who were living with an adult who was poor in 1995. This variable comes from the U.S. Census Bureau and is considered the best measure of student poverty. Participation in the free or reduced priced lunch program

is the measure most often used to indicate student poverty levels, though use of this variable often results in an underreporting of poverty levels, especially at the secondary school level. We conducted preliminary analyses with each of the two poverty measures and found very similar results. Here, we only report findings using the Census Bureau variable.

We also wanted to include an indicator of district location; namely whether the district is located in a rural, suburban or urban setting. To do this we had three options. First, the Federal government (including the census bureau and the National Center for Education Statistics (NCES) within the U.S. Department of Education) categorizes school districts in two ways. First, they use a three level code which first differentiates between metropolitan and non-metropolitan locations. They first code those districts in counties without a metropolitan area. These can be roughly described as rural districts. Next, within counties with metropolitan areas, they differentiate between urban areas and everything else. This three-level code is straightforward but fails to differentiate the non-metropolitan areas. A second categorization is the federal government's seven-level code. This categorization differentiates between large and medium sized cities, between suburbs of large and medium sized cities, between large and small towns, and finally a category labeled rural. This is a useful and detailed code, though it becomes cumbersome and complex in interpreting results of some analyses. Additionally, preliminary analyses using this code yielded many similarities between the various sub categories. The third option is the NYSED categorization of school districts that mixes both wealth and location. For instance, this six-level code differentiates high need school districts into two

locations: city/suburban and rural. It also has separate categories for New York City and the Big 4 (Buffalo, Rochester, Syracuse, and Yonkers). Finally, there are categories for average and low need districts (of all locations).

We created a new coding scheme; what we feel is a good compromise between the simplicity of the 3-level code and the specificity of the 7-level. We combined the two city, the two suburban, and the two town categories into three simple categories of city, suburban, and town. We then maintain the rural code as the fourth category. In the following analyses, we use both this 4-level code and the NYSED Needs Index to illustrate differences among the urban, suburban, town, and rural districts, but also between the low and high need districts.

We use three educator-to-student ratios as another set of independent variables. These ratios serve as key variables in answering the central research questions of this study. In calculating the educator to student ratios, we calculated the number of teachers as follows. Each full time teacher was given a value of 1 while part-time teachers were assigned a value of .5. We calculated the numbers of 'other professionals,' 'para-professionals,' and administrators the same way. We then simply divided the total number of teachers, paraprofessionals, other professionals, and administrators by the total enrollment of k-12 students in the district. While we created an administrator to student ratio, a total teacher (including all three types) to student ratio, and total adult to student ratio, these ratios are not reported in this report. This is because the effects of these ratios did not add anything substantial to the analyses. In the following analyses, we used the

teacher to student, paraprofessional to student, and the other professional to student ratios.

The third set of independent variables is the financial in nature. Here we include a measure of district spending per student. We chose to use the approved operating expense divided by the total aidable pupil units (AOE/TAPU). We next use a measure of the ability of a community to pay for its schools. Here we use the combined wealth ratio (CWR) which is a combined measure of both a community's property wealth and income. This is in the form of a ratio with 1.0 being the state average. Any ratio larger than 1.0 is an indication of above average wealth and a district with a ratio of less than 1.0 is below the state average in terms of property values and income. The third fiscal variable in the model represents a district's effort at paying for its schools. The Hurd small cities tax rate is the rate at which localities are taxing property to pay for the operation of the school district.

Together, these three sets of variables -- demographic, ratios, and financial -- construct a model that we think will allow measurement of the effect of the educator to student ratios while controlling for other known effects on student performance.

Results[3]

In short, we found results similar to those from nearly all other studies of this kind over the last 30 years. The most important predictors (at least correlates) of student

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[3] All tables, figures, and maps can be found in the Appendix.

achievement are demographic and community based. The wealthier the community and the children within a school district the better the district performs as a whole. We do, however, find some aberrations and interesting findings related to the demographics, ratios, and district wealth.

Figure 1 displays three different measures of district-level English performance categorized by the 4-level urbanicity code (i.e., city, suburb, town, and rural). We find modest difference between locations on the English Regents exam with urban districts having significantly lower passing rates than school districts located in small and large towns.[4] Concerning the 4th grade ELA exams, suburban districts, on average, outpace the urban districts by nearly ten percentage points. With regard to high performance on the English regents, districts located in towns performed slightly higher than their rural or more metropolitan counterparts. Of interest is the relationship between district performance on the English measures and the CWR. What is surprising is the strong performance of the town-based school districts considering their high need status. The average CWR is below the state-wide average of 1.0 and well below the low need suburbs. In short, the town and suburb academic performance is virtually indistinguishable though the towns have far less wealth (income and property) in their communities.

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[4] All differences discussed in this study are statistically significant ($p \leq .05$). We do not discuss non-statistically significant differences between means.

Figure 2 displays relative math performance across the NYSED Needs Index. As expected, the low need districts outperform the average and high need districts on every measure. Among the high need districts, all of which have a similar CWR, there are marked and significant differences between the Big 4, the other urban and suburban high need districts, and the high need rural districts. The rural districts perform better than the urban and suburban, and the urban and suburban districts perform better than their Big 4 counterparts. In short, when holding district need constant, rural districts perform quite well though they still lag behind the average and low need districts.

We now turn to the major focus of this study. Figure 3 displays three ratios and the aforementioned measures of English performance. Rural districts have slightly better (and statistically significant) teacher to student ratios than do the other three locations. This advantage, however, is not associated with improved test scores. With regard to the ratios of "paraprofessionals" and "other professionals" to students, we found small differences. In fact, there are no statistical differences between any of the four school locations with regard to paraprofessionals.

Finally, once categorized by the NYSED Needs Index, the low need districts have the 'best' teacher to student ratio, the best performance on the math exams, and the highest rates of students graduating with Regents diplomas. High need rural districts appear to have the smallest ratio of paraprofessionals to students, and significantly less than the urban high need, average need, and low need districts. The explanation for this finding is likely twofold. First, the high need urban districts receive high levels of state and federal

compensatory aid which 'buys' more paraprofessionals. Second, the average and high need districts seemingly would have their own dollars with which to purchase additional help in the form of paraprofessionals. The differences in administrative staffing (principals and assistant principals) across districts were not statistically significant and therefore will not be discussed further.

We also investigated the gains in the percent of the high school graduates with Regents' diplomas from 1997 to 1999. While only a two-year period, these years represent a major shift in state-level priorities when the Board or Regents called for all students to earn a Regents diploma. As expected, the wealthier districts had higher rates of Regents diplomas (see Figure 4), but in terms of gains made between 1997 and 1999, the suburban, town, and rural improved at the same rate of approximately four percent (see Tables 1 & 2). As we will discuss next, we were unable to explain what did account for the differences in gains in the percentage of regents diplomas awarded.

While we found bi-variate differences across locations and needs, and in the staffing patterns, it was still unclear as to what factors were contributing to (or at least associated with) the performance differences. To better understand the complex relationships between district location, district wealth, staffing patterns, and student performance, we then constructed a series of regression models that attempt to identify the effects of a variable independent of the other variables.

Our model incorporates the "usual suspects" of student and community wealth, location (e.g., rural vs. suburban), a variety of educator-to-student ratios, and fiscal measures. The first step of the model we enter the indicator of student poverty and three location variables. The inclusion of city, suburban and town (and not rural) allows us to specify the independent effect of a school district being located in such a location as compared to the effect of being located in a rural area. In other words, any effect (positive or negative) that we find for the city, suburb, or town variables is the effect compared with the rural districts. In the second step of the model, we enter three ratios: Teacher to student, other professional to student, and paraprofessional to student. These ratios, while modestly correlated to each other are distinct enough from each other that they all warrant inclusion in the model. Finally, we enter three fiscal measures. The approved operating expense (AOE) per pupil unit, the CWR, and the small cities tax rate (Hurd) which is the rate at which the locality taxes itself to pay for school district operation. The regression results are found in Table 3 (with a simplified version in Table 4) and suggest several interesting and important findings.

1) The degree to which the regression models explain the variation in each of the eight outcome variables (r^2) is quite varied. For example, our model explains 48% of the variance in the 4th grade ELA exam results, while essentially accounting for none of the variance (1%) in the change in percentage of Regents diplomas awarded. Generally speaking, the greater variance explained the better specified the regression model and the more explanatory the set of independent variables. When the r^2 figure

is small, there must be other factors – not accounted for in the model – that explain the differences in performance levels across districts.

2) The wealth of the local community has a very profound impact on the 4th grade ELA exam results. Between the poverty rate for the children in the community and the CWR, these community-based factors dominate the correlates of this measure of student achievement. In terms of the ELA-4 exam, nearly all of the explained variation in performance is accounted for by the two wealth variables. More specifically, if a district is one standard deviation above the mean (roughly a CWR of 2.0) on the CWR, and one standard deviation below the mean (roughly 5% poor children) on the poverty measure, the resulting district performance in the ELA-4 would be approximately 67% of the 4th graders performing at levels three or four. Conversely, a district with a CWR of .5 and 20% poor children have less than 50% of their 4th graders scoring at level three or four. We remind the reader that these results are above and beyond the effects of the other fiscal measures (district spending and tax rate), urbanicity, and district staffing (i.e., ratios). This relationship of non-school factors to district performance is less pronounced for the 4th grade Math assessment. The CWR has a much smaller effect on the math achievement, though the effect of poor children remains as strong. Of course, these findings are consistent with other studies that have concluded that English language-type skills are much more closely aligned with home environment (i.e., most parents read to their children – particularly in higher socioeconomic status families -- and teach them to read) than are math skills where many fewer parents engage in math activities with their children.

3) In terms of district location and the effect on district performance, we found little related to a district's urbanicity. In the regression models, the only significant difference from rural locations was the positive effect of a district being located in a town (large or small) on the English Regents performance. The effect is weak though positive and suggests that, when compared with rural districts, districts located in towns are more successful in having students perform better on the English Regents.
4) Of interest next are the ratios. Here we see a seemingly disturbing finding that a larger teacher-to-student ratio appears to depress the test scores on the ELA-4, Math-4, and high level math-1 Regents performance (See negative relationships in Tables 3 or 4). A more plausible explanation is that (as a result or federal and state money) the ratio of teachers to students is better in areas where students are poor and had traditionally performed lower (high need urban and rural districts). This explanation, however, does not reconcile with Figure 3 in which the rural districts have a significantly higher ratio than the other three locations and the relatively high teacher-student ratios in high need rural, average, and low need districts (see Figure 4). These findings suggest that lower teacher to student ratios may further hamper urban districts.
5) Our inability to explain any of the variance in school district improvement in Regents diplomas awarded suggests that school districts are responding to very different pressures and using other resources than we are measuring here. Much more investigation into this area is essential. We did, however, conduct an additional analysis (not shown) on only the rural school districts. We found that the teacher-student ratio had a moderate and positive effect on the rate of increase in regents

diplomas awarded. So while the effect of the teacher to student ratio on absolute levels of rural school performance are negligible, the effect on the rate of increase in rural school performance may be important. There were no significant effects for the paraprofessional or other professional ratios on this outcome variable.

6) The teacher/student ratios have modest effects across the different outcome variables. But in most cases the effect is negative. This, again, is clearly highlighting the additional resources (in the form of extra staff) that are already being targeted toward under-performing districts. Further investigation into *when* increases in ratios result in increased achievement is necessary. As reported here, we simply examined current staffing ratios and not changes (increases or decreases). We did another additional analysis (not shown here) in which we inserted the percentage change in the teacher to student ratio between 1997 and 1999. The average increase in the ratio is miniscule and made no significant improvement in our model. Over time, we will continue to monitor the change in ratios and may someday detect a measurable effect.

Conclusions

This brief report attempted to summarize the highlights of a study investigating the relationship between teacher-to-student ratios, district wealth, and student performance. We confirmed earlier studies that emphasize the tight link between the students' family wealth and the wealth of the broader community. These forces are clearly impacting student performance patterns across NY State, though more for language-based examinations than for mathematics examinations. Moreover, since the CWR had such strong effects, it suggests strong support for the theory that higher levels of social,

economic, and political capital within communities greatly enhances learning opportunities outside of school. In other words, above and beyond any measurable school effects, wealthier communities have strong and positive effects on the achievement levels of their children. Conversely, in poor communities, there is a greatly reduced non-school effect which suggests an even more important role for schools in these areas. We make these conclusions because the CWR is distinct from school spending, the rate at which the community is taxing itself, and the location of the district. In other words, wealthier communities that spend less on their schools (AOE/TAPU) than their wealthy counterparts and tax themselves at rates that are lower than other districts, still have very positive and strong effects on their children's achievement. This relationship is stronger for language-based exams than for Mathematics, though the relationship still holds.

The location of school districts (city, suburban, town, vs. rural) had few effects once controlling for the staffing and fiscal variables. Bivariate differences existed in terms of student performance, wealth, and professional staffing, though once in the regression model the only significant difference was between rural and town districts on the English Regents.

The results concerning the ratios were disappointing. They revealed very modest effects and mostly in the negative direction. One positive finding was the relationship between the teacher-student ratio and gains in the percentage of regents diplomas awarded among rural schools.

In sum, non-school wealth related variables continue to have a significant impact on the performance of children. The locations of districts have minor effects, as do the ratios of educators to students. This is not to say that the small effects of the non-wealth variables are worthless and not worthy of attention. It is these variables that school personnel have some control over. While school leaders cannot impact the CWR or the number of children in poverty in their district, they can impact staffing patterns, tax rates, dollars expended, and the educational program. Findings from this study suggest that minor changes to staffing patterns and tax rates alone will not have a significant impact on achievement. Focus on increasing school and classroom effects (quality instruction) relative to non-school effects (e.g., community wealth) is a major priority for educators. The notion that schools are the great equalizer and the pathway to an improved standard of living is suspect until we can reduce the relative effect of non-school variables and increase the effect of schools on student performance.

Appendix

Table 1 - Descriptive Statistics Across 4-Level Urbanicity Code

		N	Mean	Std. Dev.	Min.	Max.
% ELA-4 Level 3&4	City	40	53.2	15.6	24	81
	Suburb	274	61.2	14.3	14	91
	Town	68	55.7	10.8	37	78
	Rural	276	53.6	11.6	26	82
	Total	658	57.0	13.5	14	91
% Math-4 Level 3&4	City	40	71.4	14.3	40	92
	Suburb	269	81.5	12.1	31	100
	Town	65	76.4	10.5	56	99
	Rural	272	75.9	11.1	45	100
	Total	646	78.0	12.1	31	100
% Pass English (AGE)	City	38	69.1	25.8	32	196
	Suburb	258	77.0	19.4	12	191
	Town	66	80.1	45.7	45	431
	Rural	277	73.9	22.0	4	204
	Total	639	75.5	24.9	4	431
% Pass Math 1 (AGE)	City	37	72.0	24.0	0	118
	Suburb	254	81.7	23.1	0	197
	Town	66	75.1	23.4	3	140
	Rural	275	76.7	20.0	7	147
	Total	632	78.3	22.0	0	197
% 85-100 English (AGE)	City	38	19.8	24.6	3	158
	Suburb	258	22.5	12.2	0	83
	Town	66	26.7	44.5	1	374
	Rural	277	19.2	11.4	0	91
	Total	639	21.4	18.9	0	374
% 85-100 Math 1 (AGE)	City	37	34.2	20.0	0	86
	Suburb	254	40.5	20.2	0	165
	Town	66	35.0	16.8	0	85
	Rural	275	32.1	14.0	0	73
	Total	632	35.9	17.8	0	165
% Regents Diplomas 1999	City	38	49.1	16.9	0	81
	Suburb	259	54.1	17.8	0	83
	Town	66	53.4	9.1	26	74
	Rural	281	50.3	12.3	0	100
	Total	644	52.1	14.9	0	100
Change in % Regents Dipl's 97-99	City	38	1.4	5.5	-9	13
	Suburb	258	4.0	7.7	-32	28
	Town	66	3.9	7.6	-19	25
	Rural	281	3.9	13.7	-70	100
	Total	643	3.8	10.7	-70	100
% Poor Children (5-17)	City	40	15.8	13.4	2	46
	Suburb	273	9.2	6.3	1	34
	Town	73	14.8	7.4	2	30
	Rural	284	15.9	7.2	1	42
	Total	670	13.0	8.1	1	46
Teacher to Student Ratio	City	38	0.076	0.005	0.06	0.09
	Suburb	258	0.078	0.015	0.06	0.2
	Town	66	0.076	0.006	0.06	0.09
	Rural	280	0.083	0.022	0.06	0.23
	Total	642	0.080	0.018	0.06	0.23

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		N	Mean	Std. Dev.	Min.	Max.
ParaProf. to Student Ratio	City	38	0.026	0.009	0.01	0.05
	Suburb	259	0.024	0.017	0	0.16
	Town	66	0.023	0.008	0.01	0.04
	Rural	281	0.022	0.017	0	0.24
	Total	644	0.023	0.016	0	0.24
OtherProf. to Student Ratio	City	37	0.008	0.002	0	0.01
	Suburb	258	0.009	0.004	0	0.05
	Town	66	0.008	0.002	0	0.01
	Rural	280	0.008	0.007	0	0.09
	Total	641	0.008	0.005	0	0.09
AOE/TAPU for Expense	City	41	$ 6,171	$ 1,151	$ 4,764	$ 10,403
	Suburb	279	$ 7,590	$ 2,058	$ 4,502	$ 15,024
	Town	70	$ 6,162	$ 1,473	$ 4,677	$ 12,276
	Rural	288	$ 6,319	$ 2,809	$ 4,122	$ 28,615
	Total	678	$ 6,817	$ 2,409	$ 4,122	$ 28,615
Combined Wealth Ratio	City	41	0.90	0.41	0.45	2.31
	Suburb	279	1.36	0.91	0.40	5.44
	Town	70	0.87	0.51	0.36	2.82
	Rural	288	1.10	2.03	0.20	21.32
	Total	678	1.17	1.47	0.20	21.32
Small Cities Tax Rate	City	41	0.019	0.003	0.009	0.023
	Suburb	279	0.020	0.004	0.004	0.036
	Town	70	0.017	0.004	0.008	0.024
	Rural	288	0.015	0.004	0.000	0.027
	Total	678	0.017	0.005	0.000	0.036
% of Total Revenue - Local	City	41	54.6	17.7	20.0	87.8
	Suburb	286	65.8	20.2	15.0	96.1
	Town	73	50.0	21.3	16.8	98.6
	Rural	294	45.0	22.0	9.7	98.2
	Total	694	54.7	23.1	9.7	98.6

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Table 2 - Descriptive Statistics Across NYSED Needs Index

		N	Mean	Std. Dev.	Min.	Max.
% ELA-4 Level 3&4	Big 4	4	29.6	3.9	24	34
	High need urban/suburbar	37	40.6	9.4	16	60
	High need rural	158	48.6	9.6	26	80
	Average need	324	57.6	10.9	0	91
	Low need	106	73.2	8.2	48	90
	Total	632	56.7	13.6	0	91
% Math-4 Level 3&4	Big 4	4	49.4	6.8	40	55
	High need urban/suburbar	35	62.8	10.4	31	80
	High need rural	155	72.5	11.2	45	100
	Average need	320	78.3	10.1	17	100
	Low need	104	89.9	7.4	50	100
	Total	621	77.6	12.5	17	100
% Pass English (AGE)	Big 4	4	50.3	20.5	32	79
	High need urban/suburbar	37	62.9	29.1	12	196
	High need rural	160	73.9	34.5	4	431
	Average need	333	74.4	18.9	5	158
	Low need	108	84.9	20.2	9	191
	Total	654	74.5	25.7	2	431
% Pass Math 1 (AGE)	Big 4	4	36.0	29.4	0	72
	High need urban/suburbar	37	56.3	17.3	16	92
	High need rural	160	73.6	18.8	34	139
	Average need	330	78.6	22.2	0	197
	Low need	105	91.4	20.7	10	173
	Total	647	77.4	24.8	0	275
% 85-100 English (AGE)	Big 4	4	8.0	7.4	4	19
	High need urban/suburbar	37	15.3	25.0	1	158
	High need rural	160	20.5	29.9	0	374
	Average need	333	19.4	9.6	0	54
	Low need	108	30.7	14.2	0	91
	Total	654	20.9	18.9	0	374
% 85-100 Math 1 (AGE)	Big 4	4	10.3	10.6	0	25
	High need urban/suburbar	37	19.4	9.5	1	43
	High need rural	160	30.3	13.9	4	78
	Average need	330	35.1	15.2	0	142
	Low need	105	52.3	21.1	0	165
	Total	647	35.4	18.7	0	165
% Regents Diplomas 1999	Big 4	4	24.6	6.9	17	33
	High need urban/suburbar	37	39.2	14.2	4	63
	High need rural	162	47.8	11.1	24	74
	Average need	336	53.4	13.7	0	100
	Low need	111	58.4	20.2	0	83
	Total	666	50.9	16.4	0	100
Change in % Regents Dipl's 97-99	Big 4	4	2.7	2.7	-1	5
	High need urban/suburbar	37	1.3	8.2	-32	11
	High need rural	162	3.8	11.1	-35	36
	Average need	333	4.2	11.7	-70	100
	Low need	111	4.1	7.4	-18	33
	Total	663	3.9	10.7	-70	100
% Poor Children (5-17)	Big 4	4	39.3	7.9	28	46
	High need urban/suburbar	36	23.8	6.7	14	42
	High need rural	156	21.5	5.4	12	42
	Average need	325	10.6	4.7	2	24
	Low need	107	4.8	3.3	1	17
	Total	628	13.3	8.2	1	46

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		N	Mean	Std. Dev.	Min.	Max.
Teacher to Student Ratio	Big 4	3	0.077	0.005	0.07	0.08
	High need urban/suburbar	37	0.076	0.008	0.06	0.09
	High need rural	161	0.080	0.011	0.06	0.16
	Average need	336	0.080	0.021	0.06	0.23
	Low need	111	0.085	0.025	0.06	0.23
	Total	648	0.081	0.019	0.06	0.23
ParaProf. to Student Ratio	Big 4	4	0.027	0.006	0.02	0.03
	High need urban/suburbar	37	0.025	0.008	0.01	0.04
	High need rural	162	0.021	0.009	0.00	0.06
	Average need	336	0.026	0.030	0.00	0.34
	Low need	111	0.024	0.013	0.00	0.08
	Total	666	0.024	0.022	0.00	0.34
OtherProf. to Student Ratio	Big 4	3	0.008	0.004	0.00	0.01
	High need urban/suburbar	37	0.009	0.003	0.00	0.02
	High need rural	161	0.007	0.003	0.00	0.02
	Average need	335	0.009	0.008	0.00	0.09
	Low need	111	0.011	0.004	0.00	0.04
	Total	647	0.009	0.006	0.00	0.09
AOE/TAPU for Expense	Big 4	4	$ 6,023	$ 551	$ 5,422	$ 6,731
	High need urban/suburbar	37	$ 6,466	$ 1,270	$ 4,745	$ 9,170
	High need rural	162	$ 5,605	$ 907	$ 4,122	$ 11,789
	Average need	327	$ 6,185	$ 1,316	$ 4,430	$ 14,160
	Low need	111	$ 9,610	$ 3,015	$ 5,390	$ 28,207
	Total	641	$ 6,647	$ 2,157	$ 4,122	$ 28,207
Combined Wealth Ratio	Big 4	4	0.67	0.31	0.50	1.13
	High need urban/suburbar	37	0.65	0.18	0.40	1.32
	High need rural	162	0.56	0.26	0.20	2.45
	Average need	327	0.90	0.46	0.37	4.15
	Low need	111	2.43	1.72	0.85	11.80
	Total	641	1.06	1.03	0.20	11.80
Small Cities Tax Rate	Big 4	4	0.018	0.004	0.013	0.021
	High need urban/suburbar	37	0.020	0.005	0.012	0.036
	High need rural	162	0.015	0.004	0.000	0.023
	Average need	327	0.018	0.004	0.006	0.028
	Low need	111	0.018	0.005	0.004	0.029
	Total	641	0.018	0.004	0.000	0.036
% of Total Revenue - Local	Big 4	4	36.9	16.8	20.0	59.7
	High need urban/suburbar	37	41.9	12.2	19.9	81.3
	High need rural	161	32.6	12.2	9.7	85.9
	Average need	331	53.0	17.1	15.0	93.1
	Low need	111	84.6	8.1	59.2	97.3
	Total	644	52.6	22.2	9.7	97.3

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Table 3 - Regression Results for Various District Performance Measures

	% ELA-4 Level 3&4	% Math-4 Level 3&4	% Pass English Regents	% Pass Math1 Regents	% 85-100 English Regents	% 85-100 Math 1 Regents	% Regents Diplomas 1999	Change in % Regents Diplomas '97 to '99
Demographics								
% Poor Children	-0.50 **	-0.49 **	-0.16 **	-0.28 **	-0.07	-0.27 **	-0.41 **	-0.03
City District	-0.01	-0.06	-0.03	-0.04	0.01	0.01	-0.02	-0.05
Suburban District	-0.02	0.02	0.08	0.06	0.06	0.08	0.06	0.04
Town District	0.01	-0.01	0.10 *	-0.03	0.13 **	0.03	0.05	0.01
Ratios								
Teacher to student	-0.22 **	-0.11 *	0.14 *	0.05	0.06	-0.10 *	0.02	0.07
Paraprof to student	-0.01	0.06	0.03	0.00	0.04	0.07 ^	0.01	-0.01
Other prof to student	0.08 *	0.00	-0.11 *	-0.03	-0.05	-0.09 *	0.08 ^	0.02
Financial								
AOE/TAPU	-0.03	0.05	-0.28 **	-0.16	-0.17	-0.13	-0.27 **	0.03
Combined Wealth Ratic	0.38 **	0.10	0.32 **	0.21 *	0.32 **	0.37 **	0.09	-0.09
Small Cities Tax Rate	-0.02	-0.11 **	0.01	-0.03	0.03	0.05	-0.05	-0.07
r^2 (variance explained)	0.48	0.31	0.08	0.12	0.07	0.20	0.17	0.01

Notes:

** p≤.01, * p≤.05, ^ ≤.10

All values are standardized coefficients

Regents results are for average grade equivalent (age)

Comparison group for urbanicities are rural school districts

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Table 4 - Simplified Regression Results for Various District Performance Measures

	% ELA-4 Level 3&4	% Math-4 Level 3&4	% Pass English Regents	% Pass Math1 Regents	% 85-100 English Regents	% 85-100 Math 1 Regents	% Regents Diplomas 1999	Change in % Regents Diplomas '97 to '99
Demographics								
% Poor Children	Strong neg.	Strong neg.	Weak neg.	Moderate neg.		Moderate neg.	Strong neg.	
City District								
Suburban District								
Town District			Weak pos.		Weak pos.			
Ratios								
Teacher to student	Moderate neg.	Weak neg.	Weak pos.			Weak neg.		
Paraprof to student						Weak pos.		
Other prof to student	Weak pos.		Weak neg.			Weak neg.	Weak pos.	
Financial								
AOE/TAPU			Moderate neg.				Moderate neg.	
Combined Wealth Ratic	Strong pos.		Moderate pos.	Moderate pos.	Moderate pos.	Strong pos.		
Small Cities Tax Rate		Weak neg.						

Notes:

Comparison group for urbanicities are rural school districts

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Figure 1 - District English Performance & Wealth by 4-Level Urbanicity Code

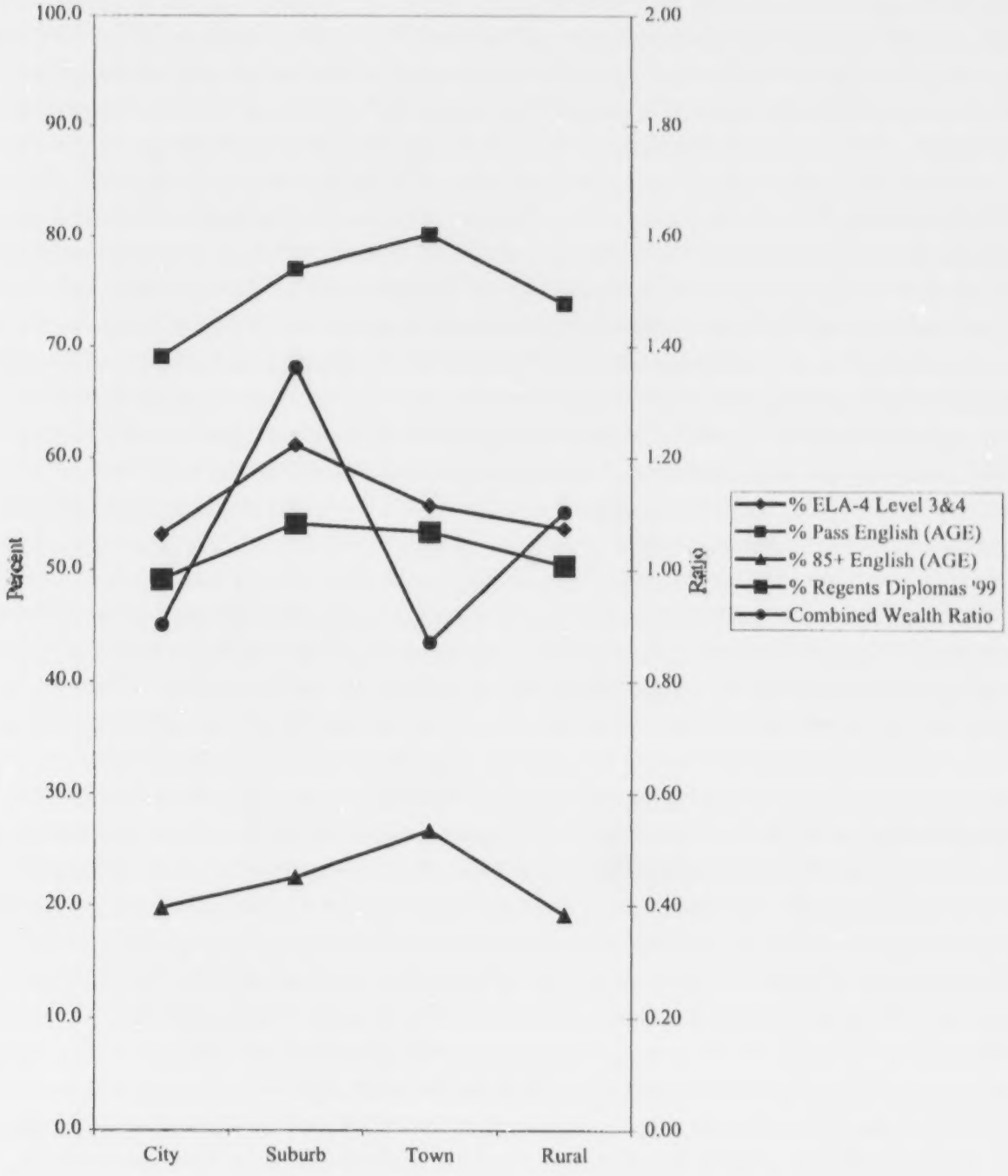


Figure 2 - District Math Performance & Wealth by Needs Index

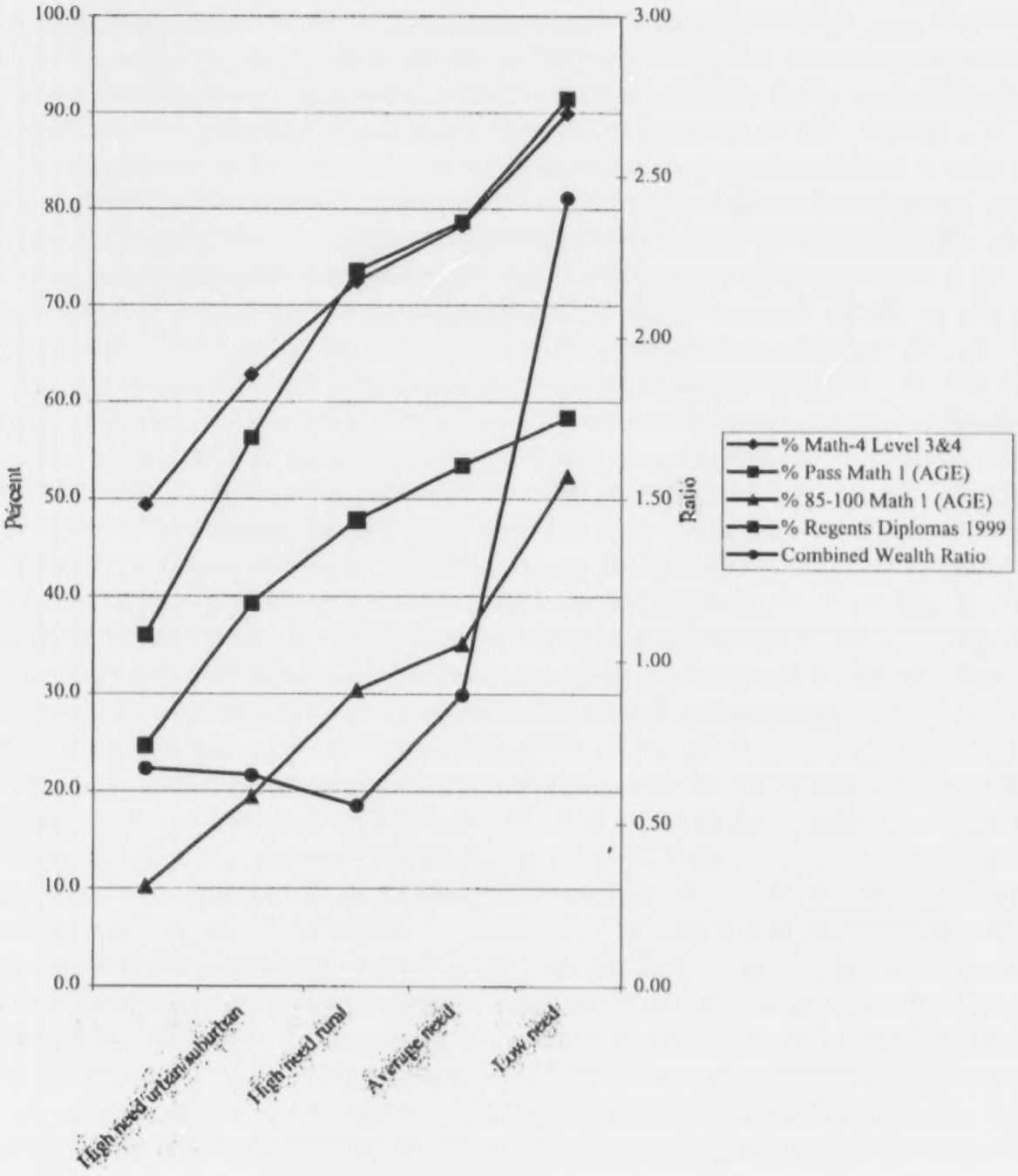


Figure 3 - Ratios and District Performance by 4-Level Urbanicity Scale

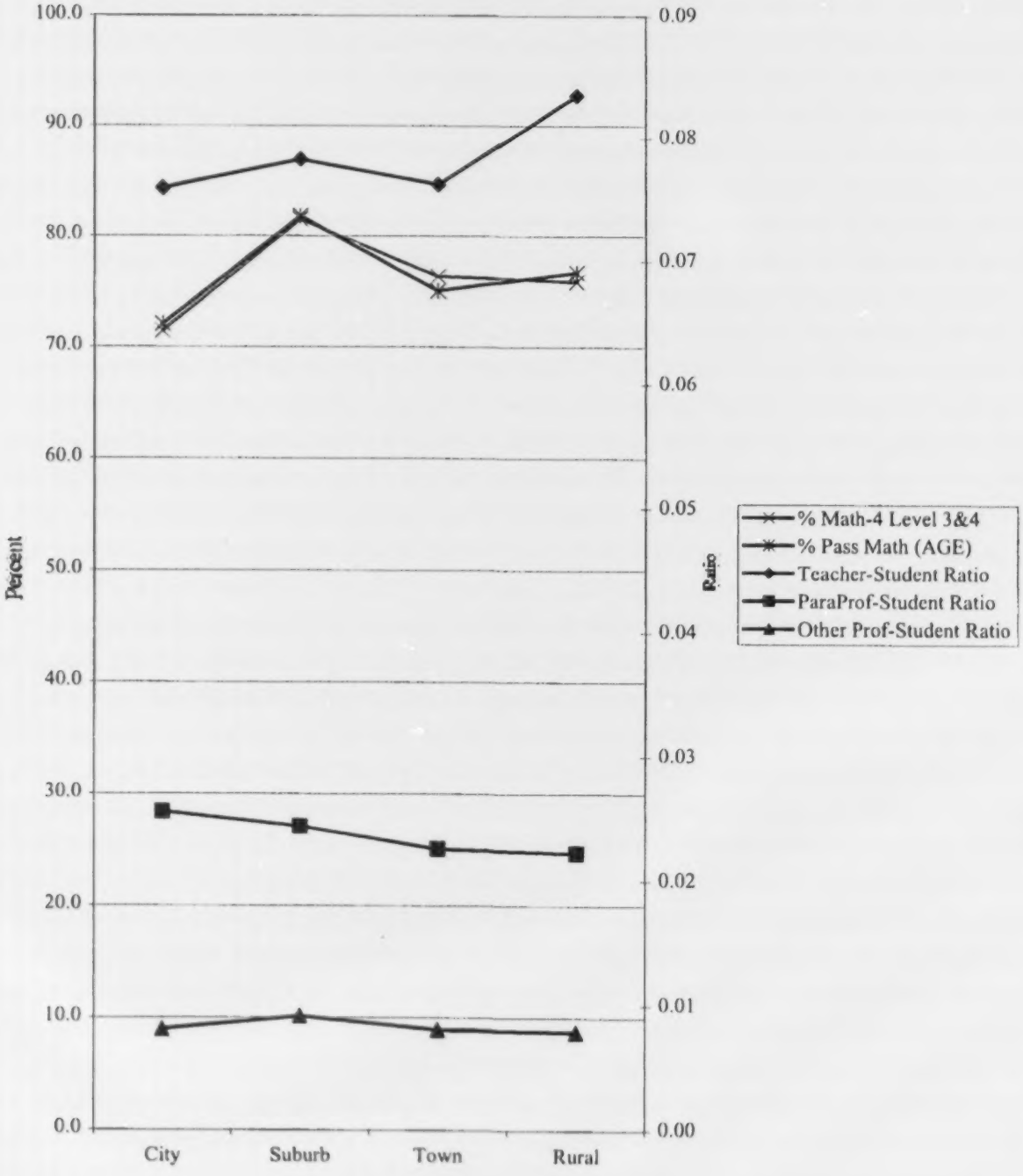
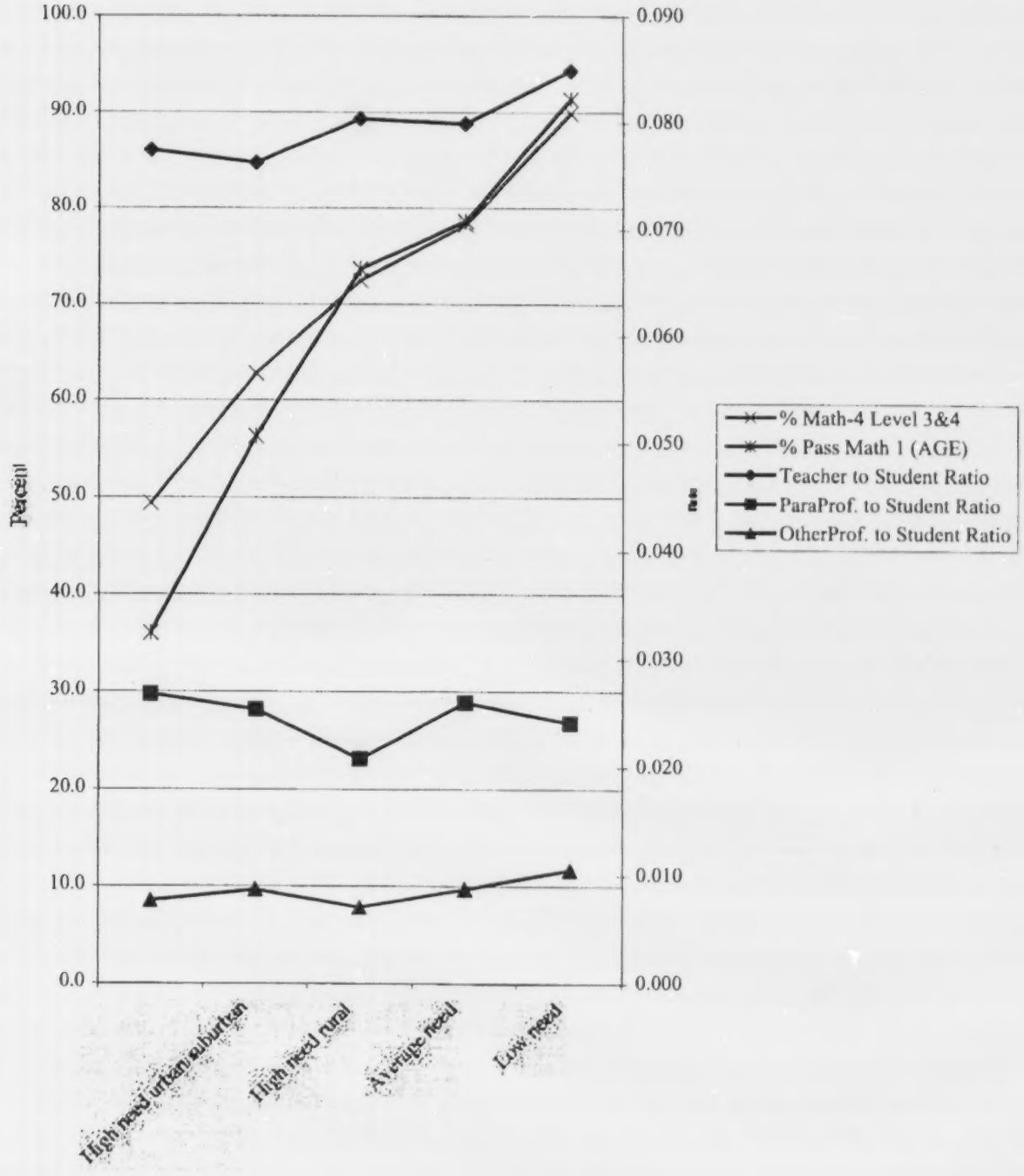


Figure 4 - Ratios and District Performance by Needs Index



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